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FIELD OF INVENTION

BACKGROUND OF THE INVENTION

However, these methods of performing surveys are inaccurate and inefficient, often taking considerable time to collect and process the information. For example, a traditional direct mail survey may take more than 100 days before a provider reviews a final report and the survey participants may not even be recent users of the products or services. A direct mail process normally determines a random survey sample from a customer data base provided by disk from the product or service provider. An initial seven to fourteen days may be allowed for sending a pre-notification letter and a direct

1 mailing of the survey to each survey participant. Then, reminder cards to complete
2 the survey are sent to non-respondents after ten days with a second direct mailing
3 being sent after an additional thirty days. Once the direct mail effort is completed,
4 telephone interviews may also be performed to meet the response rate quota. A final
5 report is only sent to the product or service provider two to three weeks after attaining
6 the required response rate quota.

7 Furthermore, although computers are likely to be used to analyze the survey
8 data, human agents are still typically used to enter the data into a computer or to
9 perform the actual survey questioning in both traditional mail and telephone surveys.
10 Unfortunately, human agents are expensive to hire, increasing survey costs, and
11 humans often make mistakes, leading to survey inaccuracies.

12 One possible solution involves using computer-operated surveys where the
13 participant uses the touch-tone feature of a telephone to enter replies to questions.
14 Such a system, however, seems impersonal to the participant, often leads to mistakes
15 if the participant forgets the key/answer mapping, and is limited to the use of touch-
16 tone telephones. Such a solution also does not provide an adequate means to obtain
17 actual participant verbal responses to questions. Actual recorded verbal responses
18 have the advantage of capturing the participant's subjective tone and emotional state,
19 as well as capturing the participant's objective opinion.

20 It would be advantageous to automate the survey process to reduce the number
21 of human beings utilized in the survey process, to increase the accuracy, reduce the
22 costs, improve the efficiencies, and overcome the shortcomings of current techniques
23 identified above. Modern computer and networking technology provides potential

1 solutions to these problems. Advances in voice recognition, database design,
2 computer processing, and computer networking all provide means to improve the
3 process of performing a survey.

4 In addition, because all survey participants tend to be asked the same pre-
5 determined list of questions, little insight into the particular reasons behind the
6 answers are typically available. Conventional means of solving this problem may
7 involve having a longer, more complex survey or having the participant state a reason
8 for his or her answer. However, the provider of a survey assessment may only be
9 interested in detailed reasons behind an answer in particular situations, such as when a
10 participant is very dissatisfied with a service or product, while the same provider may
11 not care why a survey participant was satisfied with a different service or product. A
12 longer complex survey causes a participant to become frustrated at the relevancy and
13 time commitment involved in completing the survey, thus, encouraging the participant
14 not to complete the survey fully or to end the survey prematurely. Likewise,
15 processing stated "reasons" using standard techniques can be difficult, time-
16 consuming, and costly.

17 Conventional written surveys attempt to solve this process, for example, by
18 telling a participant to "skip section X if you answered 'no' to question Y" or to
19 "complete section Q only if you answered 'poor' to question T". Telephone or
20 surveys often require the survey agent to follow similar instructions. This can be
21 confusing and frustrating to participants and agents alike, often leading to errors or
22 incomplete surveys. More sophisticated, automated survey techniques that depend on

1 neither the participant nor the agent's understanding of the survey structure would be
2 advantageous.

3 Accordingly, an adaptable survey questioning procedure would be useful, one
4 that determines the depth of questioning on certain topics depending on the answers
5 given to questions on that topic, and that utilizes computer technology to process
6 verbal replies. Better utilization of modern computers and software and the reduction
7 in the reliance of human agents on performing the survey questioning would be
8 beneficial to the product and service providers and the survey participants, as well as
9 any agents performing the surveys.

10 **BRIEF SUMMARY OF THE INVENTION**

11 According to the present invention, an interview system includes a
12 questioning series of core item questions and a second questioning series of drill-
13 down questions that are provided only when a previous response is within a
14 predetermined range to enable a more focused survey. The second questioning series
15 may also contain open-ended questions called verbatims where the survey participant
16 may give a detailed response to further explain an answer.

17 The invention provides a system of collecting survey information. The system
18 includes a first questioning series of core item questions developed to support a
19 survey purpose. A second questioning series of drill-down questions is provided
20 wherein each of the drill-down questions is associated with one of the core item
21 questions and one of the drill-down questions is presented only when a response to the
22 associated core item question meets a specified criterion.

1 The system is an automated system. The second questioning series contains at
2 least one verbatim question presented only when a response to a previous question
3 meets a specified criterion and wherein a detailed response to the verbatim question
4 may be given to further explain the response to the previous question. The system
5 includes a device for recording a response to a verbatim question literally.

6 The invention also provides a method of collecting and managing survey data.
7 The steps include presenting a first core item question and recording a response to the
8 first core item question; interpreting the first core item response; presenting at least
9 one drill-down question and recording a response to the drill-down question only if
10 the first core item response meets specified criterion; and presenting a second core
11 item question and recording a response to the second core item question.

12 Additional steps include interpreting the response to the drill-down question;
13 and presenting at least one verbatim and recording a verbatim response if the drill-
14 down response is not within the predetermined acceptable response range. Other
15 steps include presenting a second drill-down question and recording a response to the
16 second drill-down question only if the response to the one drill-down question meets a
17 specified criterion; and presenting a second core item question and recording a
18 response to the second core item question.

19 Further steps include presenting at least one unrelated verbatim and recording
20 an unrelated verbatim response, wherein the unrelated verbatim does not depend upon
21 a previous response.

1 **BRIEF DESCRIPTION OF THE DRAWINGS**

2 FIG. 1 is a block diagram showing the technology platform upon which an
3 embodiment of the present invention operates;

4 FIG. 2 is a flow chart describing the survey process with a survey participant;

5 FIG. 3 is a flow chart illustrating an example of an embodiment of the present
6 invention;

7 FIG. 4 is a block diagram showing an survey with responses that did not need
8 greater detail;

9 FIG. 5 is a block diagram illustrating a survey which necessitated drill-down
10 questions and verbatims for greater detail.

11 **DETAILED DESCRIPTION OF THE INVENTION**

12 The interactive survey and data management method and apparatus collects
13 and manages information on a technology platform that fully integrates data
14 collection, data computation, and data presentation into one system. Unlike
15 traditional data collection processes, the interactive survey-based interview is
16 generally only a six to twenty-five day cycle.

17 As shown in FIG. 1, the major components of the communication system
18 involved with the interactive survey-based interview include a customer database 12,
19 a local area network 14, a connection device 16, a computer-assisted interview agent
20 18, an interactive voice recognition program with speech recognition 20, a network
21 server 22, and a presentation software or unit 24 that can be accessed by a computer
22 by the internet or other private network.

1 The customer database 12 contains current uses of the provider's product or
2 services and is generally updated on a daily or weekly basis. The local area network
3 14 provides automated database interchange between a provider's computer and a
4 main system computer to collect survey information such as demographic profiles of
5 members of a survey sample, costs, or clinical and biological outcome data. The
6 communication device 16, a dialer when a telephone interface is used, is an automated
7 outgoing call device that dials a programmed series of participant telephone numbers
8 at scheduled times and transfers a call to an agent 18 when a participant answers.

9 The agent 18 is a trained call center agent assisted by a computer telephony
10 interface (not shown) which creates a "call record" that follows the routing of each
11 outgoing and incoming call and provides instantaneous "pop screens" to agents for
12 fielding surveys. As shown in FIG. 2, the agent uses a computer terminal to a start
13 survey by introducing the participant to a survey before transferring the participant to
14 the interactive voice recognition unit 20 to complete an automated survey. Only oral
15 responses are required by the participant because speech recognition technology is
16 used. Thus, there are no touch-tone functions which may confuse or frustrate the
17 participant. Furthermore, the speech recognition technology provides an adequate
18 means to obtain actual participant verbal responses to questions when necessary. If
19 the participant prefers a human agent, the agent follows the same question pattern as
20 the one that is programmed for the automated survey. The participant may also
21 transfer back to an agent at anytime during an automated survey to ask the agent a
22 question or to complete the survey with the agent. The agent might intervene based

1 on a notification triggered by the participant's responses, lack of response, or some
2 other criterion.

3 The network server 22 provides the product or service provider with remote
4 access to data collected within twenty-four hours of its collection across a virtual
5 private network, which keeps all data off the public internet and ensures privacy and
6 security. This server authenticates the end user for access and encrypts and de-
7 encrypts data transferred to the survey presentation unit 24 on which the outcome
8 measurements presentation operates and where all archival and dynamic data is
9 stored. The communication system is more fully discussed in co-pending application
10 INTEGRATED COMMUNICATION SYSTEM AND METHOD, Nelson et al.,
11 incorporated herein by reference.

12 An interactive survey-based interview uses a random sample for the survey
13 that may be either a daily or weekly sample from users of the product or service. The
14 interviews usually begin within 72 hours of the service and approximately five
15 attempts per sample member are made to conduct an interview during the next six to
16 twenty-five days. Depending on the type of survey information required, the
17 interview process cycle may then repeated using a new random sample. Finally, the
18 data collected each day is available within twenty-four hours by the network server
19 and may be viewed at the provider's computer terminal by the Internet.

20 An interactive survey is tailored or customized according to the actual
21 responses of the participant. As shown in FIG. 3, a flow chart illustrates an example
22 of an interactive survey, where drill-down questions and open-ended questions called
23 "verbatim" are deployed by the survey only when the response meets specified

1 criteria, for example, when the response is not within a predetermined satisfactory
2 range. Such a survey may be use with the communication system describe previously
3 or with other electronic and computer-related devices including hand-held devices and
4 the Internet. Verbatims are questions for which a response selecting from multiple
5 choice options is not desired or expected to be appropriate. The verbal response of the
6 participant to a verbatim question is recorded literally, for example, by a digital audio
7 recording to be played back later.

8 This survey format enables the survey to go into more detailed questioning
9 only when a certain response is given by the survey participant. If the response is
10 within the satisfactory range of answers and no additional information is necessary,
11 the survey proceeds to the next standard survey question. However, if the response is
12 not within the satisfactory range of answers, only then is a drill-down question asked
13 of the survey participant. Furthermore, if a drill-down question response is not within
14 a satisfactory range, the survey may then proceed to ask for a verbatim response to
15 explain a previous response in even greater detail before asking the next standard
16 survey question. Drill-down questioning may include one question or a series of
17 questions depending on the detail needed. Likewise, one or more verbatims may be
18 asked of a participant depending if additional questioning on a specific topic is
19 necessary. This flexibility allows a survey to focus on positive or negative responses
20 and to mix qualitative and quantitative questions. Thus, the survey gathers greater
21 detail information only when necessary, enabling the survey to be as short as possible
22 for each survey participant.

1 Referring to FIGS. 4 and 5, an example of an interactive survey is presented
2 using a simulated eight-question standard survey for health plans. The standard
3 survey asked of plan participants are divided into five core items 32 or areas of
4 measurement. Each question 34 is linked to one of the five core items 32. Focus or
5 mini surveys 36 are also developed for each core item where a provider would want
6 more details to a response, for example, to determine what type of performance
7 deficiency has occurred within the core item. These focus surveys contain the drill-
8 down questions and verbatims. In FIG. 4, the focus survey were not necessary
9 because all the measurement ratings 38 by the survey participant are within the
10 predetermined acceptable response range of high or moderate satisfaction level.

11 In FIG. 5, another survey participant gave low measurement rating to
12 Questions 4 and 8. Using the interactive survey approach, focus or mini surveys are
13 then deployed for these questions that receive a low recommendation. Question 4
14 asks five drill-down questions and one verbatim; Question 8 asks four drill-down
15 questions and two verbatims. Thus, the drill-down questions extend the standard
16 survey to measure in more detail the response of the previous question. From these
17 focus surveys, the health provider would be able to learn in detail the cause of low
18 ratings in response to Questions 4 and 8. With this detailed information, the provider
19 would be able to develop a quality and performance improvement plan to identify
20 corrective actions and process changes.

21 As a result of ongoing quality improvement efforts, the performance of the
22 health provider should improve and subsequent surveys should result in higher rating.

1 As improvements are made, the focus surveys can be changed or redesign to measure
2 this change or be suspended for certain core items.

3 While the invention has been described with reference to a specific
4 embodiment, various changes may be made and equivalents may be substituted for
5 elements thereof by those skilled in the art without departing from the scope of the
6 invention. In addition, other modifications may be made to adapt a particular
7 situation or method to the teachings of the invention without departing from the
8 essential scope thereof. The present invention herein is not to be construed as being
9 limited, except insofar as indicated in the appended claims.